Practice Problems on choosing how many people to poll in surveys that can be modeled with 0 – 1 boxes

Obviously, the more people we randomly poll the more accurate our sample will be.

1. In a pre-election poll in a close race how many people would you need to poll to get: (In a close race you can assume that the SD of the box is 0.5)

a) a margin of error for a 95% confidence interval of **2%**?

b) a margin of error for a 95% confidence interval of 5%?

2. Suppose it's not a close race and it's likely to be a 9 to 1 landslide, then the SD of the box would only be 0.3 and you wouldn't need as many people for the same level of accuracy. How many people would you need to poll to get …

a) a margin of error for a 95% confidence interval of 2%?

b) a margin of error for a 95% confidence interval of 5%?

Answers

Practice Problems on choosing how many people to poll in surveys with Yes/No Questions

Obviously, the more people we randomly poll the more accurate our sample will be.

1. In a pre-election poll in a close race how many people would you need to poll to get: (In a close race you can assume that the SD of the box is 0.5)

a) a margin of error for a 95% confidence interval of **2%**?

$95\%\ CI = 2\ SE_{\%} = 2 \times SD/\sqrt{n} \times 100$

Plug in 2 Plug in 0.5 and solve for n

$2 = 2 \times \frac{0.5}{\sqrt{n}} \times 100$

$\cancel{2}\sqrt{n} = \cancel{2} \times 0.5 \times 100 = 50$

$\sqrt{n} = 25$

$\boxed{n = 2500}$

b) a margin of error for a 95% confidence interval of 5%?

$5 = 2 \times \frac{0.5}{\sqrt{n}} \times 100$

$5\sqrt{n} = 2 \times 0.5 \times 100 = 100$

$\sqrt{n} = 20 \Rightarrow n = 400$

2. Suppose it's not a close race and it's likely to be a 9 to 1 landslide, how many people would you need to poll to get: (Hint: Use the SD for a box that has 90% 1's and 10% 0's)

a) a margin of error for a 95% confidence interval of 2%? $SD = \sqrt{.9 \times .1} = .3$

$2 = 2 \times \frac{0.3}{\sqrt{n}} \times 100$

$\cancel{2}\sqrt{n} = \cancel{2} \times .03 \times 100 = 30$

$n = 900$

b) a margin of error for a 95% confidence interval of 5%?

$5 = 2 \times \frac{0.3}{\sqrt{n}} \times 100$

$5\sqrt{n} = 2 \times 0.3 \times 100 = 60$

$\sqrt{n} = 12$

$n = 144$